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High-performance Empirical Learning platform with Inexpensive Off-the-shelf Systems (HELIOS)

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HELLOS

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COLLEGE

What is HELIOS?

High-performance
Empirical
Learning platform with
Incexpensive
Off-the-shelf
Systems



What were planned?

- **Students** in Undergraduate Research course (STEC 4500) having hands-on experience on the **HELIOS** cluster to conduct empirical research on High-Performance Computing (HPC)
- From Fall 2012 to Summer 2014 **35** students used **HELIOS**.

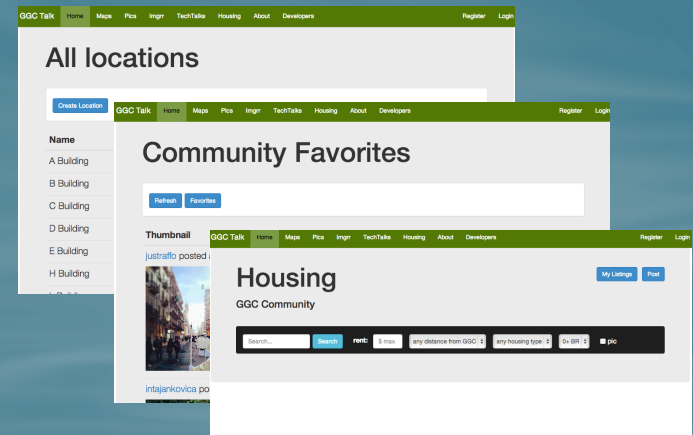
Students in STEC 4500

- **Experience** on HPC HW and SW
 - Build the cluster HW
 - Install a clustering OS
 - Setup and **configure** network
 - **Benchmarking** the cluster
- **Administering** system
 - Install and **configure** SW for other classes
 - **Monitoring** the performance of the system
 - **Access controls** for users



HELIOS in ITEC 3870

- Students in ITEC 3870 (Software Development 2) used **HELIOS** to develop a web app called, GGC-Talk (<http://tinyurl/ggctalk>)
- **Advantages** of using **HELIOS** in ITEC 3870
 - **Sandbox** for experimentation
 - **High performance platform** for building and deploying apps
 - **Minimum configuration** for scalability, security and performance



HELIOS in ITEC 4810

- Students in ITEC 4810 (IT project 1) **develop a large scale**, web-based resource & financial management system (> 100 branches)
 - By applying networks, programming, database, web tech, and system analysis and design skills
- **HELIOS provides** HW and SW framework as **a complete server**
 - No server for students to use (HW & SW)
 - common framework : PHP and SQL server
 - Not a course to teach how to install PHP nor SQL; concentrate on students' core course work

Lessons from HELIOS

- The HELIOS project taught students and faculty an invaluable lesson:
 - Building a HPC involves many challenges to students
 - students assume that the hardware setup would be most difficult,
 - but face more difficulties to configuring software.
 - and benchmarking requires programming skills.
 - Faculty also learned that ITEC courses should provide more exposure to systems administration and programming.

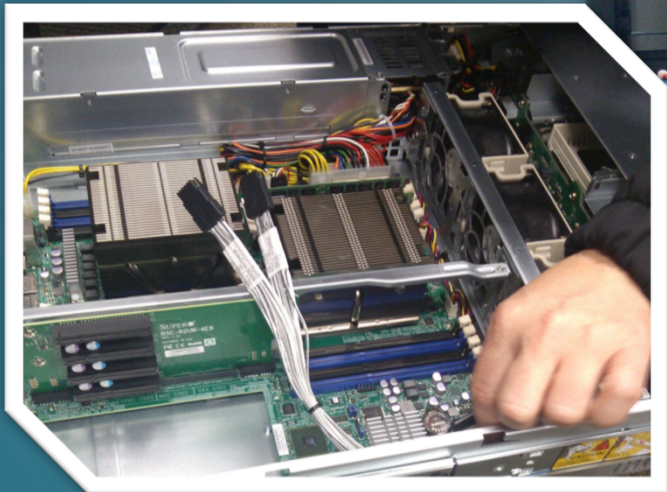
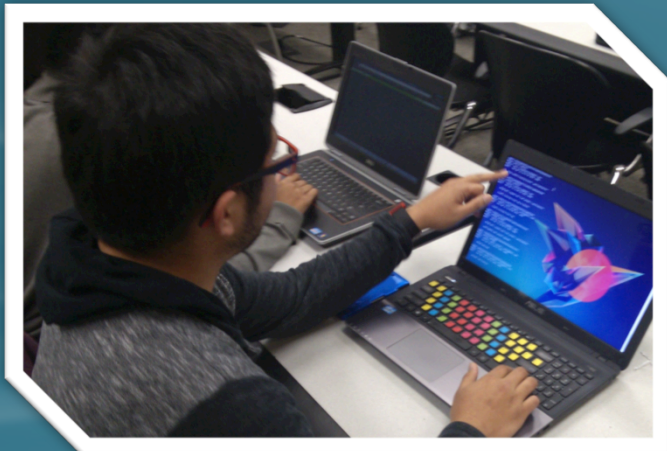
Discussion/Summary

- HELIOS provides hands-on experience with HPC to STEC 4500 students
- HELIOS provides useful resources to other ITEC courses
- Need to find and support more HPC oriented applications in the future

Future work

- Utilize HELIOS in more ITEC courses
- Build a backup management system
- Automate updates and upgrades

Questions?



HELLOS

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with Inexpensive Off-the-shelf Systems**